



Making the Turn in Chemical Safety

Gary Hagan
BWXT-Y12 L.L.C.

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Chemical Safety Challenge

- Globally, nationally and industry-wide we have a safety problem with reactive chemicals
 - Chemical Safety Board Hazard Investigation concluded that only 10% of most serious accidents involved hazard ratings of 3's and 4's
 - OSHA attempted to gain consensus approach
- Enormous numbers of possible interactions, myriad of facilities and regulations, no agreement among the experts
- The activity level is where effective improvements and accurate information reside

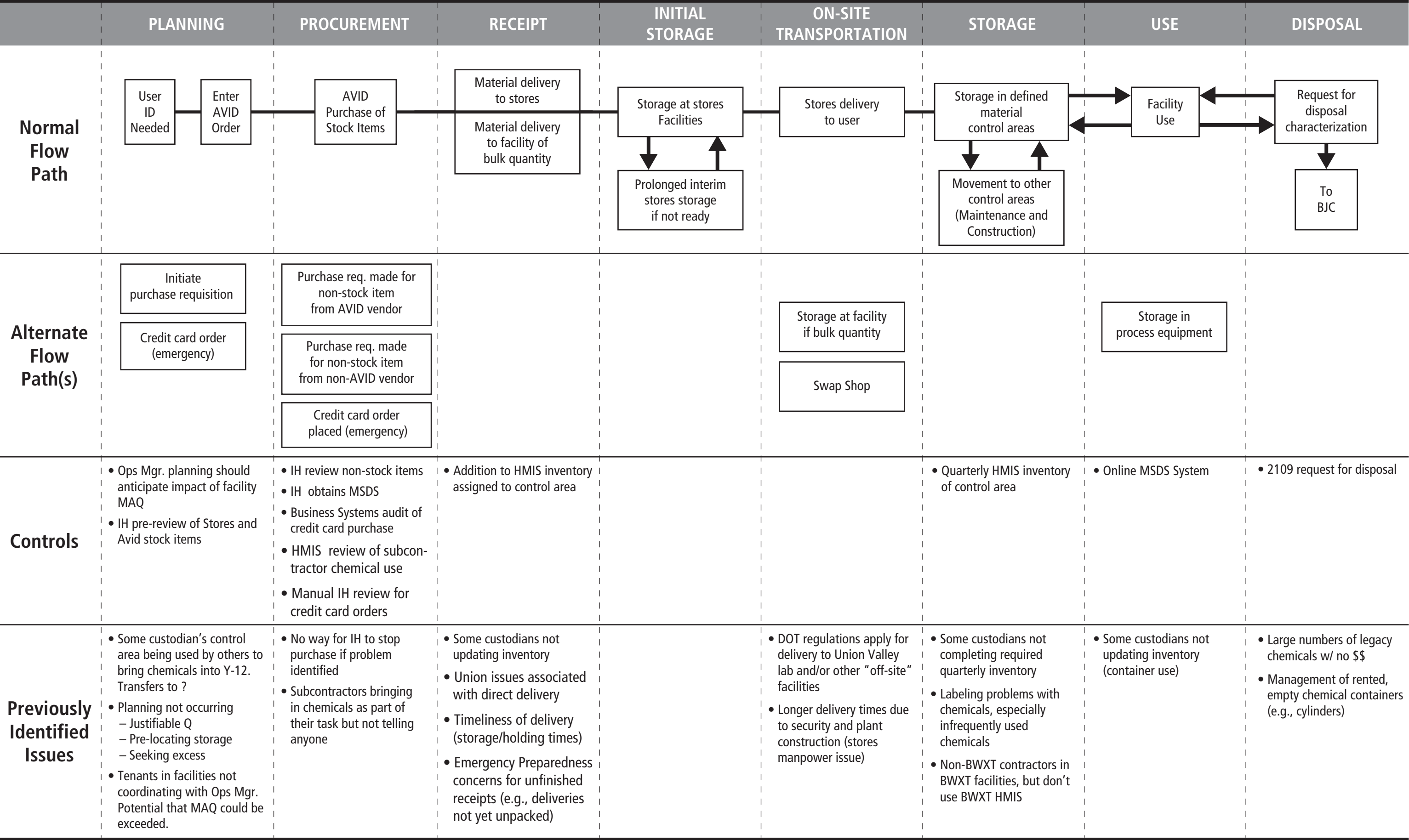
Common phenomena

- Inaccurate and/or untimely hazardous material inventories
- High incidence of label decay
- Mystery containers
- Inventories in excess of need
- Empty cylinders - (incurring monthly fees?)
- Peroxide formers, water reactives, and incompatibles
- Multiple organizations ordering the same material creating inventory excesses
- Under-appreciation for the power housed in materials

Key Approach #1

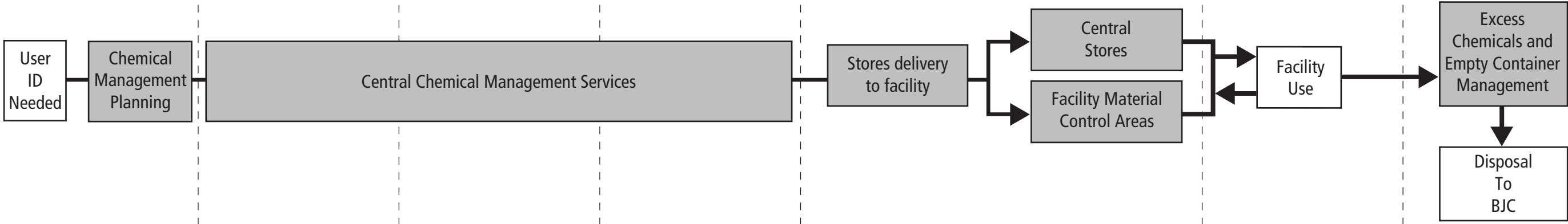
- Act now to understand the activity level processes used to manage (and mis-manage) chemicals through the life-cycle
- Diagram of Hazardous Material Life-Cycle
 - Involve the employees executing the activities
 - Examine life cycle stages of Planning, Procurement, Receipt, Initial storage, On site Transport, Storage, Use and Disposal
 - For each stage, characterize
 - Normal Flow Path
 - Alternate Flow Paths
 - Controls
 - Previously Identified Issues

Y-12 CHEMICAL MANAGEMENT PROCESS – EXISTING (4/8/02)



Y-12 CHEMICAL MANAGEMENT PROCESS – FULLY CENTRLIZED PROCESS

7/12/02 REV. 1

| | PLANNING | PROCUREMENT/ ACQUISITION | RECEIPT | INITIAL STORAGE | ON-SITE TRANSPORTATION | STORAGE | USE | DISPOSAL |
|--|---|---|---------|---|--|---------|--|--|
| Normal Flow Path |  | | | | | | | |
| Advantages Over Existing | <ul style="list-style-type: none">• More front end planning since consolidated responsibilities (e.g. MAQ comparisons, MSDS review, identification of new Y-12 chemicals, etc.• Better evaluation of less hazardous materials substitution | <ul style="list-style-type: none">• Fewer people procuring chemicals• Ability to increase vendor responsibilities• Ability to increase chemical reuse through better re-allocation of surplus chemicals | | <ul style="list-style-type: none">• Better inventory control since single group stores chemical inventory | <ul style="list-style-type: none">• Fewer chemical control areas through consolidation of areas• Offers opportunity for better control of chemicals and disposal through consolidated effort | | | <ul style="list-style-type: none">• More emphasis on recycling/reuse of chemicals |
| Dis- advantages Over Existing | <ul style="list-style-type: none">• Less user control due to presence of "middleman" | <ul style="list-style-type: none">• Vendors more involved in Y-12's business | | <ul style="list-style-type: none">• Hazard evaluation/ MAQs required for central storage areas | <ul style="list-style-type: none">• Consolidation of control areas could increase chemical hazard due to larger chemical quantities per area and storage of noncompatibles | | <ul style="list-style-type: none">• Less user control | |
| Concerns | <ul style="list-style-type: none">• Delay in receipt of chemicals by user due to "middleman"• Inability of user to get required quantity of needed chemicals | <ul style="list-style-type: none">• Ability of users to get required quality/pedigree of chemicals they need. Chemical re-allocations cannot impact quality requirements | | <ul style="list-style-type: none">• Where to locate central storage areas. On site vs. off site | <ul style="list-style-type: none">• How do facility managers remain in control of their facilities when chemical management services operates material control areas (i.e. ensure facility MAWs not exceeded)• Will central chemical management functions be hard-lined or matrixed to the centralized group• How to integrate current inventory with the new, centralized system (transition) | | <ul style="list-style-type: none">• Must be easier for users to be successful• Union (craft) concerns | <ul style="list-style-type: none">• How to protect quality needs of users due to use of recycled chemicals• Managing the transfer of chemicals from rad/non-rad areas |

 = Function managed by new Central Chemical Management Services Organization

YGG-02-0209R1

Note: • Overall, use of a centralized process should offer the advantage of using better qualified/trained people for chemical management than current Y-12 system.
• Overall, increased cost over the current system is an identified disadvantage

Key Approach #1 (continued)

- Change the process to fill requirement gaps
- Compare to the CCPS Essential Practices
- Confirm there is a manager responsible for the sites chemical safety program
- Make demonstrable chemical safety improvement the reason somebody has to get up in the morning.
- Place expert eyes and feet on the shop floor

Key Approach #2

- Set expectations at the activity level
 - Timely and accurate inventories of hazardous materials.
- Clarify chemical safety expectations to your subcontractors in writing and with face-to-face discussions with work crews.
- Make Inherent Safety one of those expectations
 - Don't accumulate / horde
 - Timely response to purchase orders
 - Automated replenishment for routinely used materials

Key Approach # 3

- Create a mutually supportive objective
 - Good DOE support translates to good management support
 - Performance metrics
 - Responsiveness to identified issues
 - Recurrence prevention

Key Approach #4

- Effective training to field personnel in recognition of hazards
 - Training trifecta
 - Your site process for buying, disposal identifying, analyzing and controlling
 - Reactive Chemical Recognition
 - Managing Insidious Chemical Hazards and Vulnerabilities
 - With the lab portion of the course
 - Set a target audience
 - Be prepared to respond to training results.

Key Approach #5

- Create tools to provide information at the activity level
 - AJHA linked to inventories, MSDS and CCPS Reactive computer based tools
 - Consolidated MSDS
 - Performance metrics on the web-site
 - http://tis.eh.doe.gov/web/chem_safety/tools.html

Key Approach # 6

- Deal with special situations as small projects
 - Mystery containers
 - Unknown lecture bottles
 - Protection of anhydrous ammonia
 - Excess materials elimination or substitution

Key Approach #7

- Plan and execute follow up activities
 - Performance metrics recommend an annual assessment.
 - Chemical safety eyes must be on the factory floor at least quarterly
 - Subcontractors and construction should be monitored more often initially
 - Confirm suppliers are not substituting periodically

Situation Today

- 99% + on time reporting for over a year
- Accuracy approaching same level
- Very low incidence of label decay
- Excess refrigerant sold with over \$600,000 benefit to NNSA
- Peroxide formers discovered and removed
- Empty cylinders - returned, sold or scrapped.
- Reviews for substitution of less hazardous materials
 - Substitute nothing is the first approach
- Identified and disposed of scores of mystery containers

What's next?

- Automated management of lifecycle using Electronic Product Code technology
- Availability of existing inventories elsewhere in the plant.
- Automated replenishments
- Chemical Supermarket?

Electronic Product Code technology

- Moving from “bleeding” to “leading” edge technology
- Unique 96 bit code placed on Smart Tag
- Portable or fixed readers detect code
- Reader controller / Host PC / software interprets code
- Need an EPCglobal identifier for DOE
- <http://www.autoidcenter.org/>
- Auto-compatibility?